IN MEMORIAM

Frederick L. Scarf (1930–1988)

On 17 July 1988 Frederick L. Scarf, the Principal Investigator of many of the spaceflight investigations of plasma waves throughout the Solar System and Chief Scientist for Space Research and Technology in the Applied Technology Division of the TRW Space and Technology Group, died suddenly in Moscow. At that time he was doing exactly what he seemed to enjoy most: planning future space explorations, in this case, the exploration of Mars with his Soviet colleagues.

Frederick Scarf was born in Philadelphia, Pennsylvania, on 25 July 1930. He obtained a B.S. degree in Physics from Temple University in 1951 and the Ph.D. degree in Physics from MIT in 1955. After graduation from MIT, he joined the faculty of the University of Washington where he pursued studies in theoretical quantum electrodynamics. As the space age dawned, he spent his summer months at the Space Technology Laboratory, now TRW. He so fell in love with the emerging discipline of space physics that he gave up his faculty position and began to work full-time on space plasmas at STL. He soon became one of the leading experts on the solar wind. It was his firm conviction concerning the importance of plasma waves in the physical processes occurring in both the solar wind and planetary plasmas that led him to be a persistent advocate of including such investigations on space missions to all these regions.

Scarf's first association with a spaceflight plasma wave instrument, that on OGO-5, quickly led to his transition from theorist to experimentalist and the leadership of a series of investigations: in interplanetary space, in the Earth's magnetotail and at Comet Giacobini-Zinner with ISEE-3; at the outer planets with Voyagers 1 and 2; and throughout the region surrounding Venus with the Pioneer Venus Orbiter. These studies led to many discoveries such as electrostatic waves at half-harmonics of the electron cyclotron frequency in the magnetospheres of both the Earth and the outer planets, and lightning-generated signals in both the magnetosphere of Jupiter and the ionosphere of Venus.

One of his most important contributions to observational space science was the generosity and openness with which he shared his observational data with other scientists; another was his role as mentor to a number of young scientists. Among these were William Kurth, William Taylor, Stewart Moses, Robert Strangeway, and myself. He was always eager to help us advance our careers. In this regard over the last few years Scarf had moved several of his programs to UCLA so students would have greater access to his spaceflight data and so he would be able to work with a larger group of young people.

He was a strong advocate of international cooperation in space and participated strongly in the planning and execution of such cooperative ventures. He was a member of the Interagency Consultative Group which helped coordinate the science programs of the four major space agencies, and when he died he was helping Soviet scientists plan their future Mars strategy. In the United States he was an important participant in the planning of the solar and space plasma physics program and the planetary program. In particular Frederick Scarf was the principal

driving force behind moving the ISEE-3 spacecraft out of its libration point orbit and sending it to Comet Giacobini-Zinner. Most recently he served on the steering committee of the National Academy of Sciences study of Space Science in the Twenty-First Century.

The planetary and solar space physics communities will deeply miss Scarf's contributions because he was very much an active participant in these communities. However, he leaves a large legacy in his many publications and in the extensive data sets his instruments have collected. His closest colleagues will miss his openness, advice, perseverance, amiability, sound judgment, humor, and enthusiasm. All those for whom he played audio tapes of signals recorded by his instruments can attest to the fact that Frederick Scarf was a true romantic of the space age who loved space science with a rare passion.

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